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Pace

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(54) **LABELLING MACHINE**

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B65C 3/06 (2006.01)
B65C 9/00 (2006.01)

(52) **U.S. Cl.**
CPC . ***B65C 9/04*** (2013.01); ***B65C 3/065*** (2013.01); ***B65C 9/00*** (2013.01); ***B65C 9/1815*** (2013.01); *B65C 9/0065* (2013.01)

(58) **Field of Classification Search**
CPC B65C 9/0065; B65C 9/04; B65C 9/1815; B65C 9/1826; B65C 3/065
USPC 156/556, 567, 568
See application file for complete search history.

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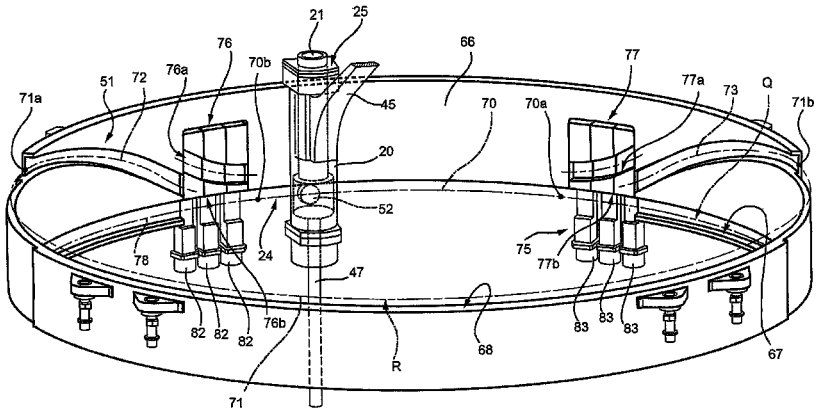
(57) **ABSTRACT**

There is described a machine for applying labels on articles transferred by respective labelling units along a given path (P); each unit comprises a receiving member having a lateral wall, which is adapted to receive a relative label and extends along an axis (F) transversal to the path (P); a cam and tappet device axially displaces the receiving members between a lowered position and a raised position and comprises a cam device, which is adjustable between a first and a second configuration; in the first configuration, cam followers of the units move along a first track (R) of the cam device to displace the respective receiving members between the lowered and raised position during transfer of the respective units; in the second configuration, the cam followers move along a second track (Q) of the cam device to maintain the respective receiving members in the lowered position during movement of the units along their path (P).

16 Claims, 6 Drawing Sheets



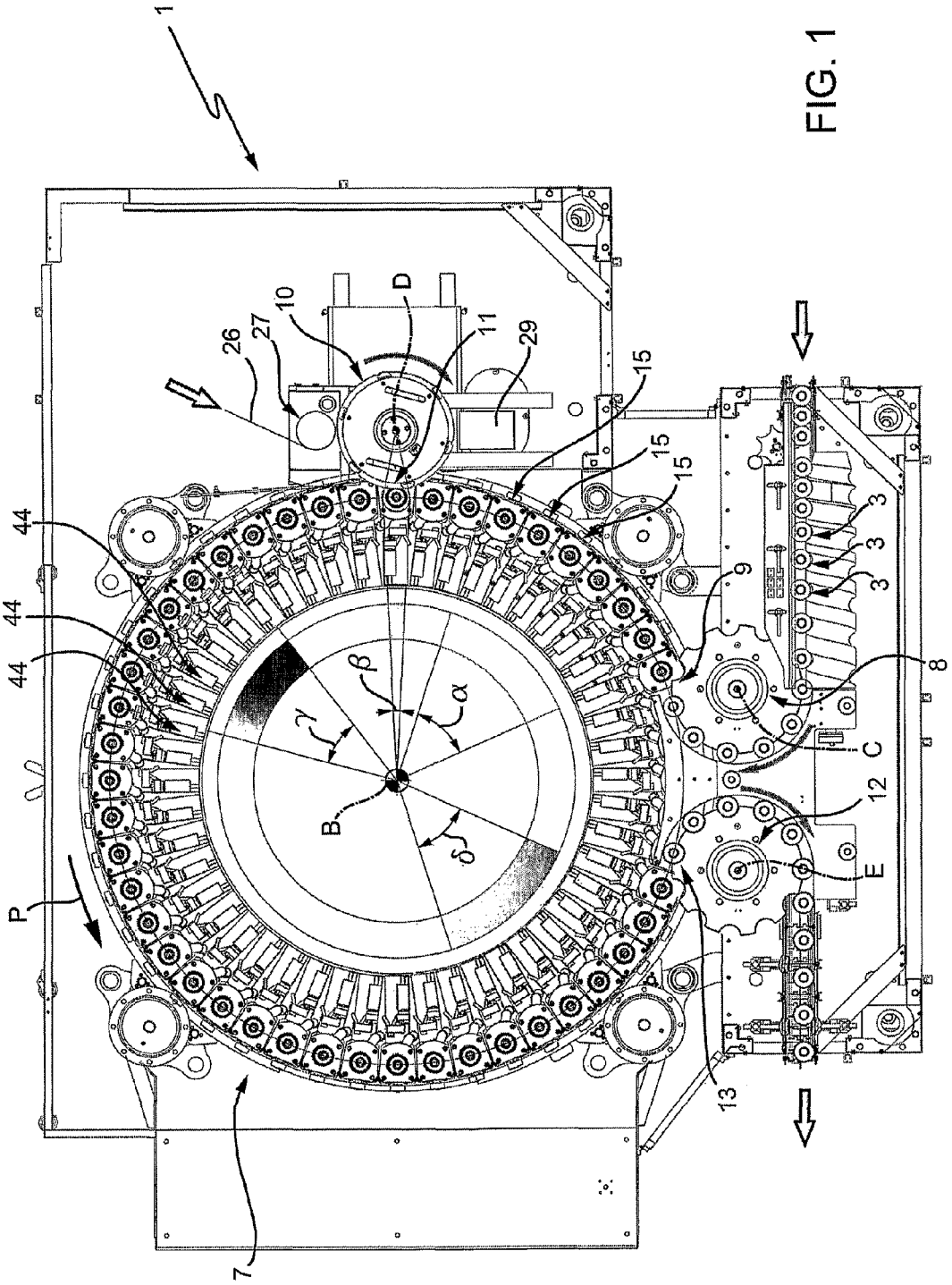
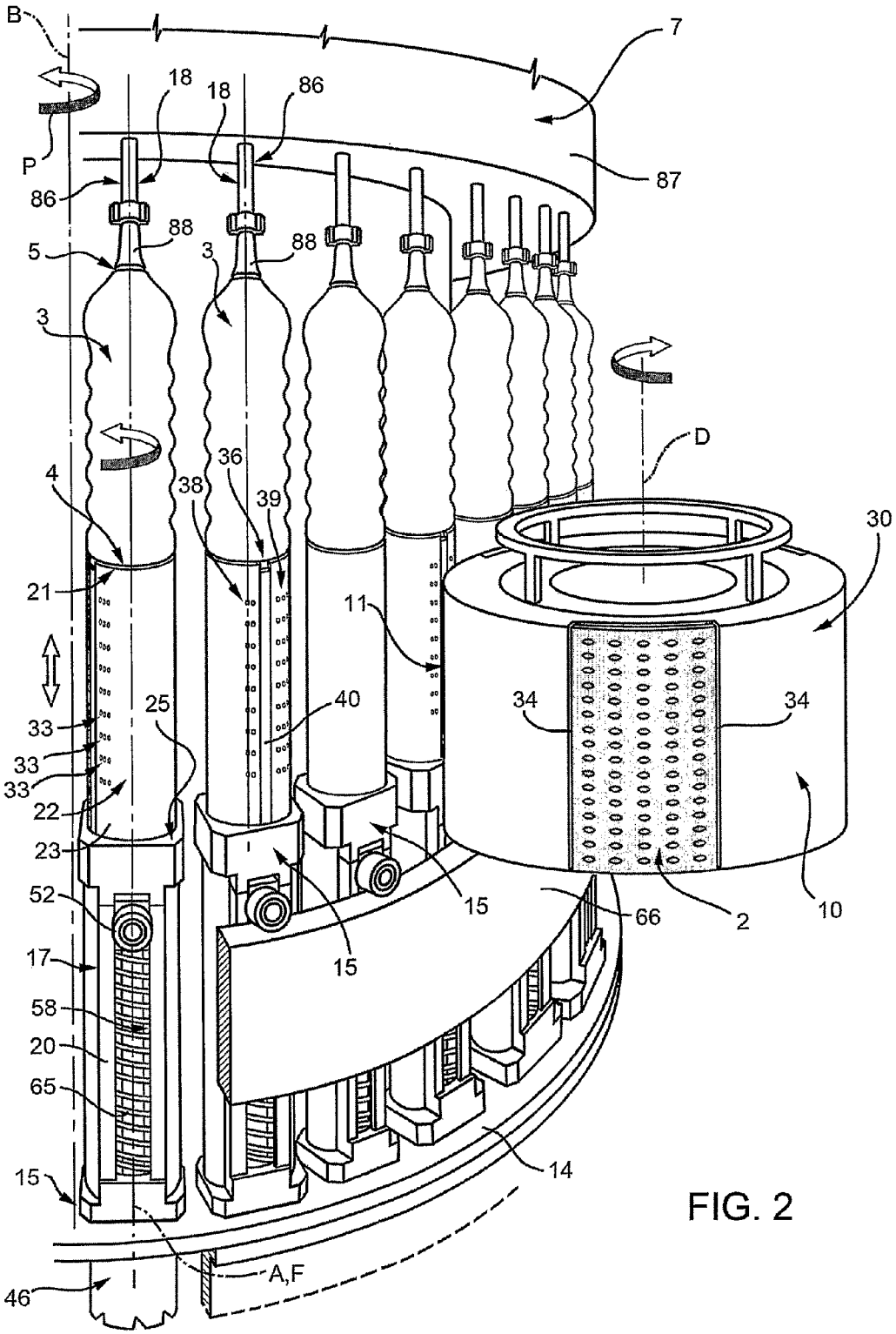


FIG. 1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66
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17
58
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65
14
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A,F
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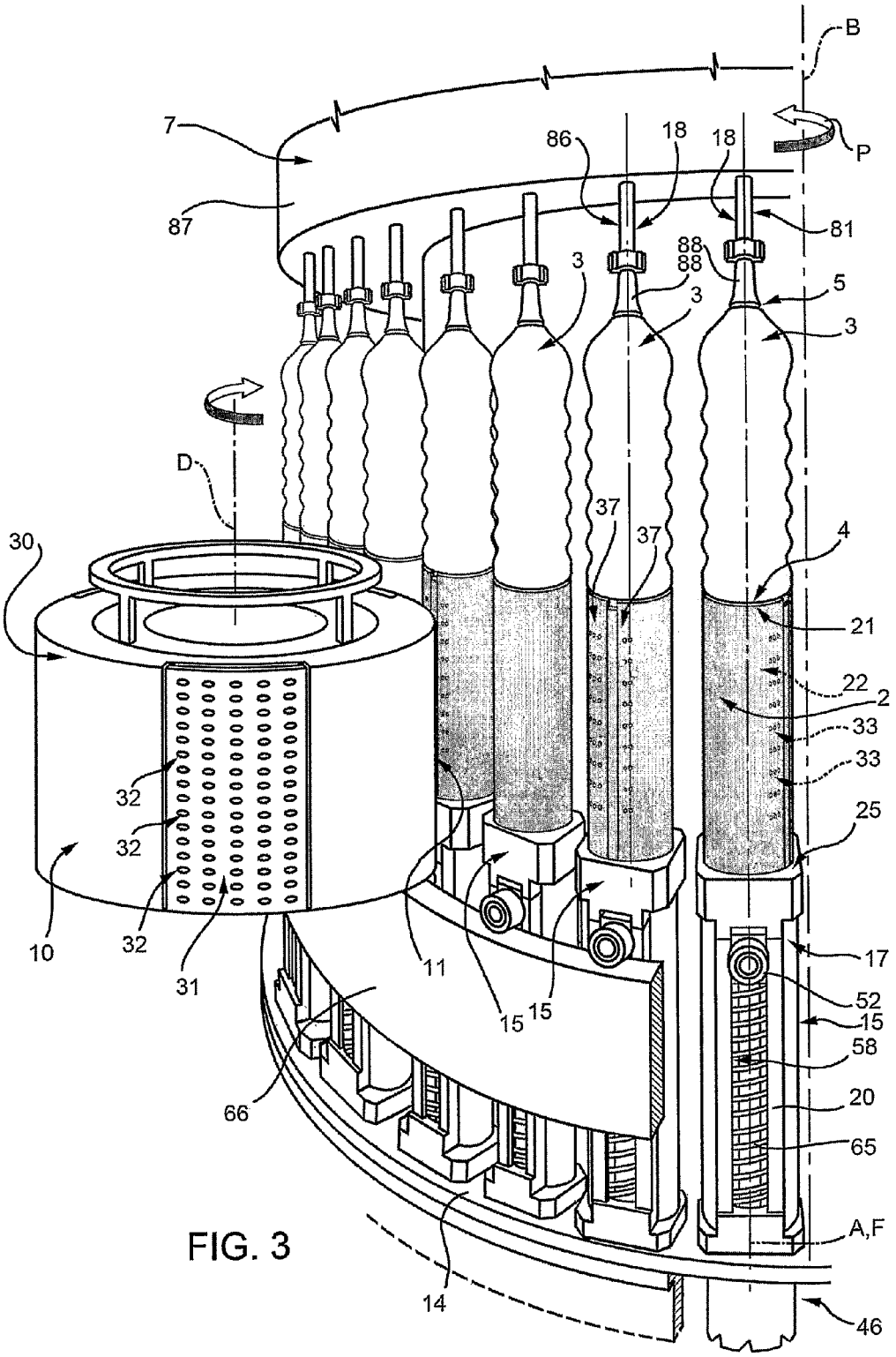
FIG. 2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46

FIG. 3

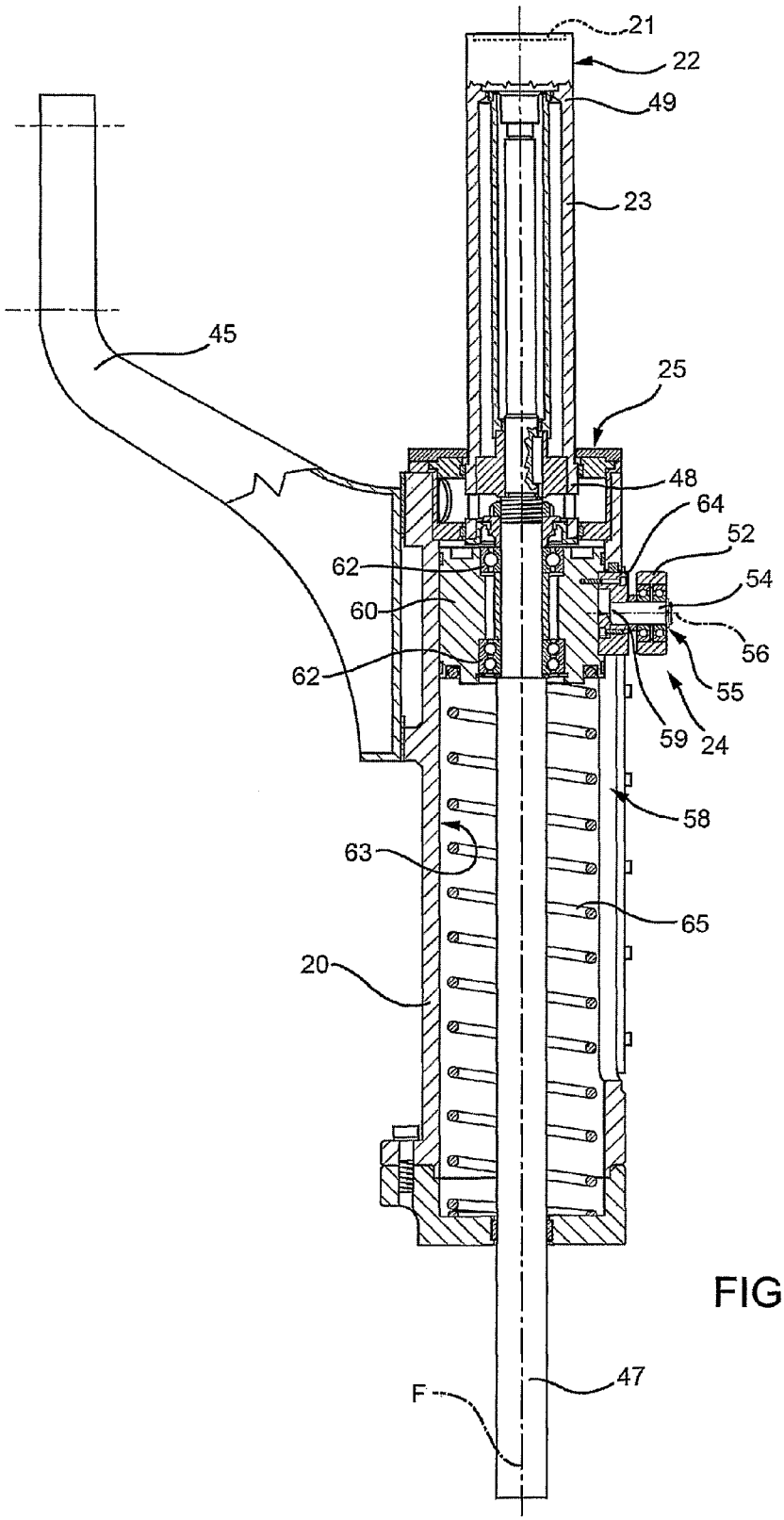
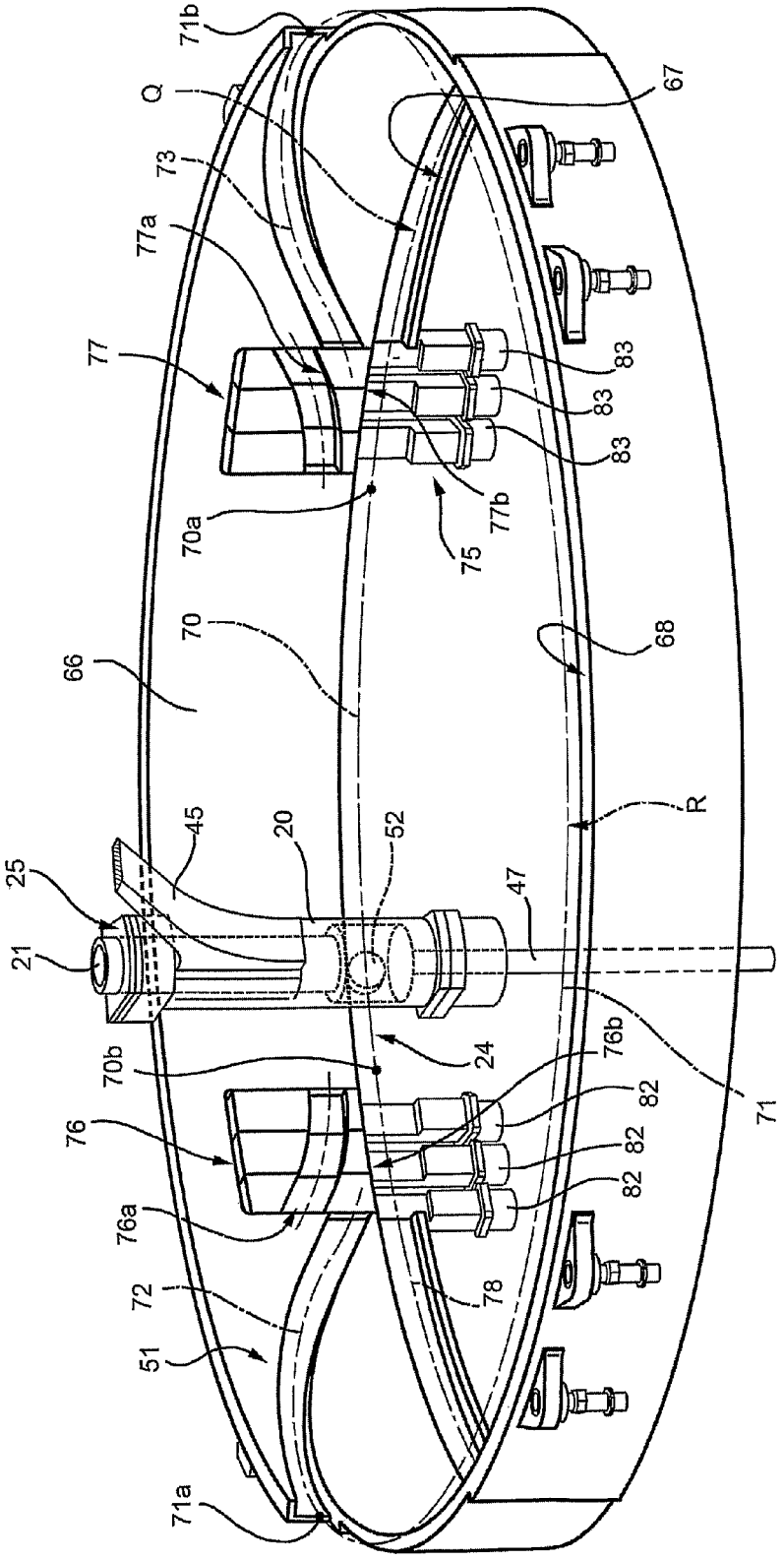


FIG. 4


71b
Q
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73
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70a
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45
20
52
25
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70b
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76a
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51
71a
71

FIG. 5

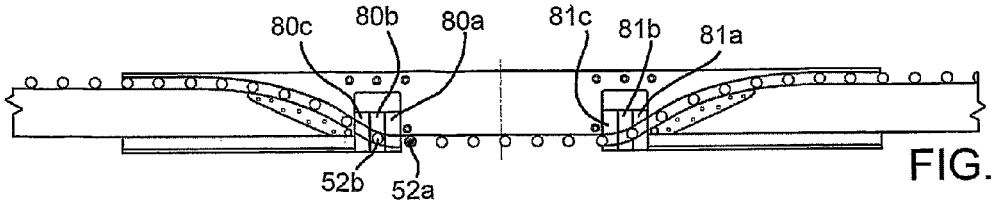

FIG. 6a

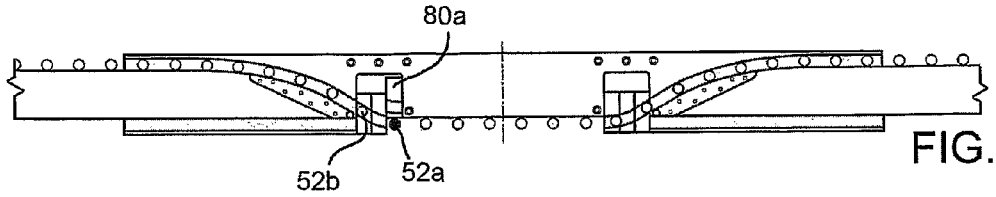

FIG. 6b

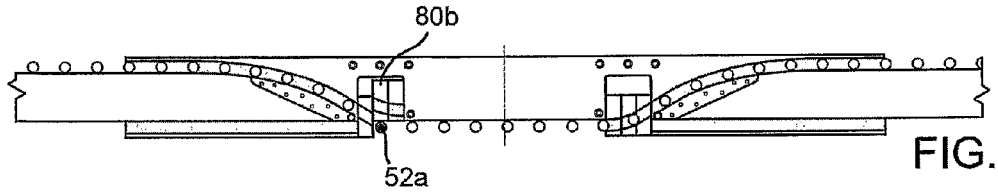

FIG. 6c

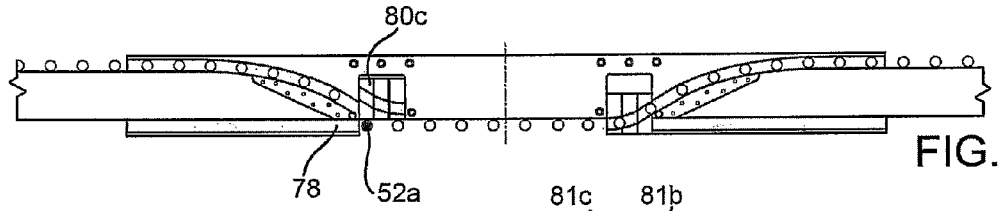

FIG. 6d

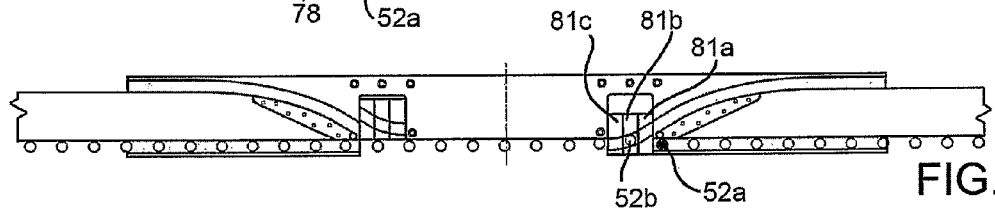

FIG. 6e

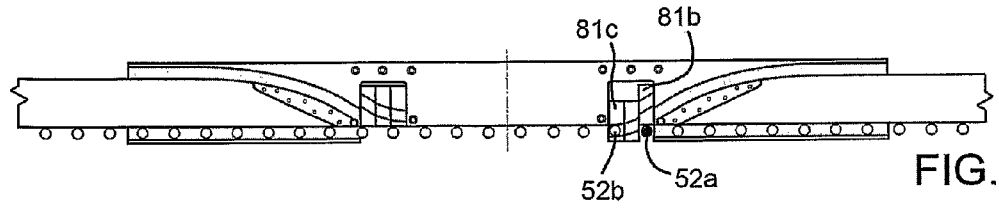

FIG. 6f

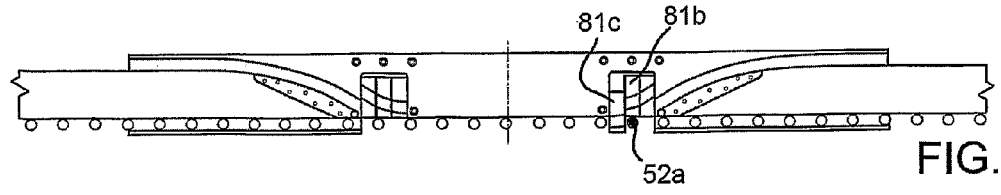

FIG. 6g

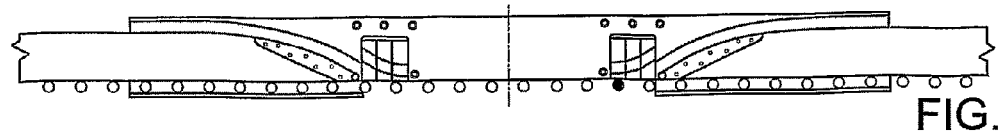

FIG. 6h

LABELLING MACHINE

PRIORITY CLAIM AND RELATED APPLICATIONS

This application is a nationalization under 35 U.S.C. 371 of PCT/IT2010/000124, filed Mar. 22, 2010, and published as WO 2011/117895 A1 on Sep. 29, 2011; which application and publication are incorporated herein by reference in their entirety.

TECHNICAL FIELD

The present invention relates to a labelling machine for applying labels on respective articles, such as bottles or generic containers, which the following description will refer to, although this is in no way intended to limit the scope of protection as defined by the accompanying claims.

BACKGROUND ART

As it is generally known, labelling machines are used to apply labels to containers or articles of all sort. Typically, for beverage bottles or vessels, two alternative techniques can be provided to attach the labels on the external surface of respective bottles. According to a first technique, the back surfaces of the labels (commonly called "roll labels") are covered with glue and are stuck onto the external surfaces of the bottles. According to a second technique, after having placed tubular labels made of heat-shrinkable film (commonly called "sleeve labels") around respective bottles, the tubular labels are heated to fit and adhere onto the bottles.

In particular, these tubular labels are obtained by:

- cutting a web unwound from a supply roll into a plurality of rectangular or square labels;
- bending each label in a cylindrical configuration such that the opposite vertical edges overlap one another; and
- welding the overlapped edges of each cylindrical label.

A particular type of labelling machine is known which serves to bend and weld labels in a tubular configuration and then to produce insertion of the bottles into the so formed tubular labels before the heating operation. This kind of machine basically comprises a carousel rotating about a vertical axis to define a circular path, along which it receives a succession of unlabelled bottles by a bottle input wheel and, then, a succession of rectangular or square labels by a label input wheel, produces application of the labels in a tubular configuration onto the respective bottles, and releases the labelled bottles to an output wheel.

More specifically, the carousel comprises a plurality of labelling units which are equally spaced along a peripheral edge of the carousel and are moved by the latter along the above-mentioned circular path.

Each labelling unit comprises a supporting assembly adapted to support the bottom wall of a relative bottle and an upper retainer adapted to cooperate with the top portion of such bottle, to hold it in a vertical position during the rotation of the carousel about its vertical axis.

Each supporting assembly comprises a vertical hollow supporting mount, secured to a horizontal plane of a rotary frame of the carousel; and a cylindrical receiving member, which engages the supporting mount in sliding and rotating manner with respect to its vertical axis, and is adapted to carry a relative bottle on its top surface and a relative label on its lateral surface.

The receiving members are displaced by a cam and tappet device between a raised position and a lowered position, while moving along the above mentioned circular path.

In the lowered position, the receiving member is fully retracted within the relative supporting mount, so that the top surface of each receiving member is flush with the top surface of the supporting mount. At the output wheel and at the bottle input wheel, each receiving member is located in its lowered position, so that the bottles are transferred onto and from the carousel along the same transfer horizontal plane.

In the raised position, each receiving member protrudes from a top surface of the relative supporting mount and is adapted to receive a relative label on its lateral surface from the label input wheel; in particular, the label is wrapped around the receiving member such that the opposite vertical edges of the label overlap one another. In order to produce this complete wrapping, the receiving member is rotated about its vertical axis during the transfer of the label from the label input wheel. The label is retained on the lateral surface of the receiving member by suction; for this purpose, at least a region of the lateral surface of the receiving member is provided with a plurality of holes, which are connected to a pneumatic suction device.

After having welded the overlapping edges of the tubular label, the suction is released and the receiving member is lowered, so as to produce the insertion of the relative bottle downwards inside the tubular label, therefore making the ensemble of the bottle and the surrounding label ready to be transferred to the output wheel.

The known labelling machines of this kind, working with the so-called "sleeve labels", are not suitable to work also with the so-called "roll labels", because the latter have to be stuck to the external surfaces of the bottles without providing vertically movable receiving members, i.e. without vertically moving the bottles. Indeed, in carousels provided to support and transfer bottles onto which labels are applied by means of glue, the supporting assemblies of the labelling units are simplified in comparison to the above described ones.

A need is felt to provide a single machine that can be configured by means of a relatively low number of operations to apply either the so-called "sleeve labels" or the so-called "roll labels", without removing or changing components from all the labelling units of the carousel.

OVERVIEW

Examples provide a labelling machine, which allows to meet the above mentioned needs in a straightforward and low-cost manner.

Such examples are claimed in claim **1**.

BRIEF DESCRIPTION OF THE DRAWINGS

A non-limiting embodiment of the present invention will be described by way of example with reference to the accompanying drawings, in which:

FIG. **1** shows a schematic plan view, with parts removed for clarity, of a labelling machine in accordance with the teachings of the present subject matter;

FIGS. **2** and **3** are larger-scale and partial views in perspective of the labelling machine of FIG. **1**, in proximity of a label transfer station;

FIG. **4** shows a section, along a vertical section plane and with parts removed for clarity, of a labelling unit of the labelling machine of FIGS. **1-3**;

FIG. **5** shows a larger-scale view in perspective, with parts removed for clarity, of a configurable cam and tappet device of the labelling machine of FIGS. **1-3**; and

FIGS. **6***a*-**6***h* schematically show a sequence of operations to set the cam and tappet device of FIG. **5** from a first configuration to a second configuration.

DETAILED DESCRIPTION

Number **1** in FIG. **1** indicates as a whole a labelling machine for applying labels **2** (shown with a grey shadow in FIGS. **2** and **3**) to respective articles or more specifically containers, particularly bottles **3**, each of which (FIGS. **1** to **3**) extends along a longitudinal axis A, comprises a bottom wall **4** substantially perpendicular to axis A, and has a top neck **5** substantially coaxial with axis A.

Machine **1** comprises a conveying device that serves to bend and weld labels **2** in a tubular configuration (FIG. **3**) and to produce insertion of bottles **3** downwards into the so formed tubular labels **2**.

In the embodiment as illustrated on the FIGS. **1** to **3**, the conveying device comprises a carousel **7**, which is mounted to rotate continuously (anticlockwise in FIG. **1**) about a respective vertical axis B perpendicular to the FIG. **1** plane.

The carousel **7** receives a succession of unlabelled bottles **3** from an input wheel **8**, which cooperates with carousel **7** at a transfer station **9** and is mounted to rotate about a respective longitudinal axis C parallel to axis B. The rotation of the input wheel **8** is continuous and synchronized with the rotation of carousel **7**.

The carousel **7** also receives a succession of rectangular or square labels **2** from an input drum **10**, which cooperates with carousel **7** at a feeding station **11** and is mounted to rotate continuously about a respective longitudinal axis D parallel to axes B and C.

The carousel **7** releases a succession of labelled bottles **3** to an output wheel **12**, which cooperates with carousel **7** at a transfer station **13** and is mounted to rotate about a respective longitudinal axis E parallel to axes B, C and D. The rotation of the output wheel **12** is continuous and synchronized with the rotation of carousel **7**.

The carousel **7** comprises a plurality of operating or labelling units **15**, which are equally spaced about axis B, are mounted along a peripheral edge of carousel **7**, and are moved by carousel **7** along a circular path P extending about axis B and through transfer stations **9**, **11** and **13**. As shown in FIG. **1**, transfer station **11** is arranged, along path P, downstream of transfer station **9** and upstream of transfer station **13**.

With reference to FIGS. **2** and **3**, the units **15** are secured to a horizontal rotary table **14** of carousel **7**, have respective axes F parallel to axes B, C, D, E and extend coaxially through respective holes (not shown) of the rotary table **14** and on both sides of such table.

Each unit **15** is adapted to receive a relative bottle **3** from input wheel **8** in a vertical position, i.e. coaxially with the relative axis F, and to hold said bottle **3** in such position along path P from transfer station **9** to transfer station **13**.

Units **15** being identical to each other, only one is described below for the sake of simplicity and clarity; it is clear that the features described hereafter are common to all the labelling units **15**.

In particular, unit **15** comprises, above the rotary table **14** of carousel **7**, a supporting assembly **17** adapted to support the bottom wall **4** of the relative bottle **3** and an upper retainer **18** adapted to cooperate with the top neck **5** of the bottle **3**.

In particular, supporting assembly **17** comprises:

- a hollow supporting mount **20**, which extends along axis F and is secured to a top surface of rotary table **14** around the relative hole thereof; and
- a hollow receiving member **22**, engaging the supporting mount **20** in sliding and rotating manner with respect to axis F, having a top end adapted to support coaxially a relative bottle **3** and comprising a cylindrical lateral wall **23** adapted to carry a relative label **2** on its outer surface.

More specifically, the top end of the receiving member **22** is defined by a support plate **21**, on which the bottle **3** rests. The support plate **21** is carried by a top portion of the lateral wall **23** via the interposition of a bearing (not visible), so as to be angularly free from lateral wall **23**. In this way, rotational movements of the lateral wall **23** about axis F are not transmitted to the bottle **3**.

Receiving member **22** can be moved along axis F between a lowered position and a raised position by means of a cam and tappet device **24**, which will be described later in greater detail. In the lowered position, the receiving member **22** is completely retracted within the supporting mount **20**, so that support plate **21** is substantially flush with a top surface **25** of the supporting mount **20**. In the raised position, receiving member **22** protrudes from the top surface **25** of the supporting mount **20** and is adapted to receive, on the outer surface of its lateral wall **23**, a label **2** made of heat-shrinkable film material from the input drum **10**.

More specifically, with reference to FIG. **1**, labels **2** are cut in a know manner from a web **26** by a cutting device **27** (schematically shown) and fed to the input drum **10**, which in turn feeds the cut labels **2** to the carousel **7**. According to the present subject matter, machine **1** can work to apply two alternative kinds of labels **2** onto the bottles **3**. According to a first labelling technique, as mentioned above, labels made of heat-shrinkable film material are fed by the input drum **10**, respectively, onto the lateral walls **23** of the receiving members **22**, while the latter are located in the raised position. According to a second labelling technique, labels **2** having glue on their back surfaces are fed by the input drum **10** directly onto the lateral surfaces of respective bottles **3**, while the receiving members **22** are maintained in their lowered position. In the latter case, in particular, back surfaces of cut labels **2** receive glue from a glue dispenser or glue applicator **29** (schematically shown), while front surfaces of cut labels **2** rest against a lateral surface **30** of the input drum **10**. The horizontal position of the input drum **10** with respect to the carousel **7** is adjusted when the labelling technique has to be changed, in order to bring input drum **10** closer to axes F when glued labels have to be applied onto the lateral surfaces of the bottles **3** or to move input drum away when heat-shrinkable labels have to be wrap around the respective receiving members **22**.

As shown in FIGS. **2** and **3**, independently from the kind of labels **2** to be applied, front surfaces of cut labels **2** are retained on the lateral surface **30** by suction; in particular, the lateral surface **30** is divided into a given number, three in the embodiment shown, of suction regions **31**, which are equally spaced about axis D, are each provided with a plurality of through holes **32** connected to a pneumatic suction device (known per se and not shown) and are adapted to cooperate with respective labels **2**.

In an analogous manner (FIG. **2**), lateral wall **23** of each receiving member **22** is provided with a plurality of through holes **33**, in turn connected to a pneumatic suction device (not shown) so as to retain the relative label **2** made of heat-shrinkable film material on its outer surface by suction.

At the transfer station **11**, lateral wall **23** of each receiving member **22** is rotated about the relative axis F in order to produce the complete wrapping of the relative label **2**, coming from input drum **10**, on its outer surface. In particular, each label **2**, fed by input drum **10**, is wrapped around the relative receiving member **22** so as to form a cylinder with the opposite vertical edges **34** overlapped one another.

More specifically, holes **33** extend only on a given portion **36**, hereafter referred to as "suction portion", of lateral wall **23**. Suction portion **36** has an arc-shaped cross section along a plane orthogonal to axis F and is sized in the circumferential direction so as to cooperate with two portions **37** of the relative label **2**, which are adjacent, respectively, to the vertical edges **34**.

In greater detail, suction portion **36** is divided into two distinct vertical regions **38**, **39** by an elastically deformable, vertical strip pad **40**, on which vertical edges **34** of a relative label **2** are placed in an overlapped configuration.

Strip pad **40** defines, in a known manner, the contrasting element for a welding device **44** (known per se and only schematically shown in FIG. **1**), arranged in front of, and in a radially inner position than, lateral wall **23** of receiving member **22** and adapted to weld the overlapped edges **34** of the relative label **2** so as to produce a tubular configuration of such label. In particular, each welding device **44** is coupled in fixed position to the supporting mount **20** of the relative unit **15** by means of a bracket **45** (FIG. **4**).

Regions **38**, **39** are located on opposite sides of strip pad **40**. Holes **33** communicate with the above mentioned pneumatic suction device through an inner space of the receiving member **22** and through an inner space in a top portion **42** of the supporting mount **20** (FIG. **4**). The inner spaces of the receiving member **22** and the top portion **42** communicate with each other in a manner not shown.

In the light of the above, receiving member **22**, during travel of the relative unit **15** along path P, is subjected to distinct movements in different operative steps of the labelling machine **1**:

- receiving member **22** is displaced along axis F from the lowered position to the raised position, after a bottle **3** has been transferred to unit **15**;
- lateral wall **23** is rotated about axis F to receive a relative label **2** from input drum **10** and to allow bending of such label **2** in the cylindrical configuration; and
- receiving member **22** is displaced from the raised position to the lowered position to allow insertion of the bottle **3** downwards within the label **2** that has been welded in the tubular configuration.

With reference to FIG. **4**, these movements are obtained by means of a driving shaft **47**, which is coaxial with the receiving member **22**, extends through the supporting mount **20** and the receiving member **22** and is coupled in fixed position to bottom and top portions **48**, **49** of the receiving member **22** in a manner not described in detail. Therefore, driving shaft **47** and lateral wall **23** of receiving member **22** are axially and angularly fixed to each other, so that any displacement transmitted to driving shaft **47** results in a corresponding displacement of lateral wall **23**.

Rotation of the driving shaft **47** is synchronized with the rotation of the input drum **10** and with the rotation of the carousel **7** and is operated by an actuator (schematically shown in FIGS. **2** and **3**), which is carried by the rotary table **14**, is arranged underneath rotary table **14** and, in particular, is secured to a bottom surface of the rotary table **14**.

Vertical displacement of the driving shaft **47** is operated by the cam and tappet device **24** independently from the rotation operated by the actuator **46**. The cam and tappet device **24** comprises a cam device **51** (FIG. **5**) and, for each unit **15**, a relative cam follower **52**, which is defined, in particular, by a roller located outside of the supporting mount **20** and mounted on an outer end portion **54** of a supporting pin **55**, so as to be axially fixed and freely rotatable with respect to an axis **56** of the supporting pin **55**. Supporting pin **55** extends radially with respect to axes B and F through a slot **58**, which is made in a lateral wall of the supporting mount **20** on the outer side with respect to axis B, i.e. on the side opposite to welding device **44** and bracket **45**. Supporting pin **55** has an end portion **59** axially opposite to end portion **54** and fixed with respect to a collar **60**. Collar **60** is coaxial with driving shaft **47** and is coupled to driving shaft **47** by means of bearings **62**, so as to be angularly free from driving shaft **47** and lateral wall **23** and to be axially fixed with respect to driving shaft **47** and lateral wall **23**. Besides, collar **60** has an outer lateral surface slidingly coupled to the inner surface **63** of the supporting mount **20**, so as to be axially guided between an upper position and a lower position.

In particular, end portion **59** is coupled to collar **60** by means of an annular element **64**, which is fastened to supporting pin **55** and to a side portion of collar **60**, and is guided by slot **58** in a direction parallel to axis F. Therefore, slot **58** defines a constraint that prevents collar **60** and cam follower **52** from rotating about axis F. Therefore, any displacement transmitted to cam follower **52** results in an axial displacement of the driving shaft **47** and receiving member **22** between the lowered and raised positions. A spring **65** is provided inside the supporting mount **20** to push collar **60** upwards and, therefore, avoid axial play during displacement of cam follower **52**.

With reference to FIG. **5**, the cam device **51** is defined by an annular structure **66**, which is fixed and extends along path P around the units **15** that are transferred by carousel **7**. Cam device **51** can be adjusted to be set in a first configuration, in which cam followers **52** move along a track R, or in a second configuration, in which cam followers move along a track Q. In particular, cam device **51** comprises two cams **67**,**68**, which alternately can be engaged by cam followers **52** and define, respectively, the tracks Q,R.

Track Q of cam **67** is used to perform the second labelling technique, is parallel to the circular path P of the units **15** and lies on a horizontal plane, i.e. a plane perpendicular to axis B, in order to maintain all the engaging cam followers **52** at a given height, that corresponds to the lowered position of the receiving members **22**.

On the other hand, track R of cam **68** is shaped so as to move the cam followers **52** along the respective slots **58** to perform lifting and lowering of the respective receiving members **22** when machine **1** is used according to the first labelling technique. FIG. **1** shows the rotation angles of the carousel **7** about axis B when such first labelling technique is performed: angle α refers to the lifting movement of the receiving members **22** from the lowered position to the raised position, angle β refers to the label transfer from the input drum **10** to the receiving members **22**, angle γ refers to the welding operation on the overlapped edges **34** of the tubular labels **2**, and angle δ refers to the downward movement of the receiving members **22** to produce insertion of the bottles **3** within the corresponding tubular labels **2**. Track R comprises:

- an arc portion **70**, which is in common with track Q, is located between transfer stations **13** and **9**, and has a beginning point **70***a* corresponding to the end of angle δ and an end point **70***b* corresponding to the beginning of angle α;
- an arc portion **71**, which is parallel to path P, has a beginning point **71***a* corresponding to the end of angle α and

an end point **71***b* corresponding to the beginning of angle δ, and is at an higher height with respect to arc portion **70**, the difference in height between arc portions **71** and **70** being equal to the stroke of the receiving members **22** along the respective axes F;

a lifting slope or ramp **72**, which joins point **70***b* to point **71***a* and corresponds to angle α;

a lowering slope or ramp **73**, which joins point **71***b* to point **70***a* and corresponds to angle δ.

Cam and tappet device **24** comprises a selection device **75** to set cam device **51** in the first or the second configuration. Selection device **75** comprises two switch devices **76**, **77** located, respectively, at points **70***b* and **70***a*, i.e. where ramps **72**,**73** meet track Q: switch device **76** comprise at least one element that can be moved in two positions, to deviate the cam followers **52** arriving from portion **70** into ramp **72** or, respectively, into a remaining portion **78** of track Q; analogously switch device **77** comprise at least one element that can be moved in two positions, to channel cam followers **52** from ramp **73** or, respectively, from portion **78** into portion **70**.

In particular, the movement of the element or, the elements, of switch device **76** set one of two guides **76***a*,**76***b* at point **70***b*; analogously, the movement of the element or, the elements, of switch device **77** set one of two guides **77***a*,**77***b* at point **70***a*.

In the first configuration, guides **76***a* and **77***a* join portion **70** to ramps **72**,**73**; in the meantime, guides **76***b* and **77***b* are located out of path R, in particular under cams **67**,**68**, so as not to be engaged by cam followers **52**. In the second configuration (FIG. **5**), guides **76***b* and **77***b* join portion **70** to portion **78**; in the meantime, guides **76***a* and **77***a* are located out of path Q, in particular over cam **67**, so as not to be engaged by cam followers **52**.

Switch device **76**, **77** comprise respective actuators **82**, **83**, located beneath cam **67**, controlled to move the above-mentioned movable elements and select guide **76***a* or **76***b* and, respectively, select guide **77***a* or **77***b*. In particular, elements of switch devices **76** are three in number, are indicated by reference numbers **80***a*,**80***b*, **80***c*, are arranged side by side along a direction parallel to track Q and path P, and are symmetrical to elements **81***c*,**81***b*,**81***a* of switch device **77**, with respect to a halfway plane on which axis B lies. Elements **80***a*,**80***b*,**80***c* and elements **81***a*,**81***b*,**81***c* can slide along directions parallel to axes B and F under the action of the actuators **82**,**83**. Each of elements **80***a*,**80***b*,**80***c* comprises a relative portion of guide **76***a* and a relative portion of guide **77***a*. Analogously, each of elements **81***a*,**81***b*,**81***c* comprises a relative portion of guide **76***b* and a relative portion of guide **77***b*.

FIG. **6***a*-**6***h* schematically show a sequence of steps to adjust the cam device **51** from the first configuration to the second configuration, with a step-by-step rotating movement of the carousel **7**. The first cam follower **52***a* to be deviated into track Q is shown in grey shadow, for sake of clarity. The width of elements **80***a*,**80***b*,**80***c*,S1*a*,**81***b*,S1*c* is equal to half the pitch between the cam followers **52**, and is higher than the diameter of each cam follower **52**.

When the last cam follower **52***b* to be deviated into track Q engages the second element **80***b*, the first element **80***a* and the third element **80***c* are void (FIG. **6***a*). In this condition, the first element **80***a* is switched to remove guide **76***a* and set guide **76***b*. Therefore, cam follower **52***a* enters into guide **76***b* of the first element **80***a* to begin to follow track Q. In the meantime, cam follower **52***b* engages guide **76***a* of the third element **80***c* to still follow track R, and the second element **80***b* becomes void (FIG. **6***b*). At this point, the second element **80***b* is switched to remove guide **76***a* and set guide **76***b*, to allow cam follower **52***a* to follow guide **76***b* of the second element **80***b* (FIG. **6***c*). In this condition, the third element **80***c* becomes void and is then switched to remove guide **76***a* and set guide **76***b*. In this way, cam follower **52***a* follows guide **76***b* of the third element **80***c* (FIG. **6***d*) and afterwards portion **78** of track Q.

When cam follower **52***a* is at the end of portion **78** (FIG. **6***e*), cam follower **52***b* engages guide **77***a* the second element **81***b*, and the first element **81***a* and the third element **81***c* are void. In this condition, the first element **81***a* is switched to remove guide **77***a* and set guide **77***b*. When cam follower **52***a* engages guide **77***b* of the first element **81***a* (FIG. **6***f*), cam follower **52***b* engages guide **77***a* of the third element **81***c*. In the meantime, the second element **81***b* is void and can be switched to remove guide **77***a* and set guide **77***b*. Finally, when cam follower **52***a* engages guide **77***b* of the second element **81***b* (FIG. **6***g*), the third element **81***c* becomes void and is then switched to remove guide **77***a* and set guide **77***b*. FIG. **6***h* shows the instant when the second configuration of the cam device **51** is completely reached, as in FIG. **5**.

A change of the cam device **51** from the second configuration to the first configuration can be performed in an analogous manner, by switching elements **80***a*,**80***b*,**80***c* and **81***a*, **81***b*,**81***c* in sequence to progressively set guide **76***a* instead of guide **76***b* and progressively set guide **77***a* instead of guide **77***b*.

Coming back now to FIGS. **2** and **3**, the retainer **18**, corresponding to the described supporting assembly **17**, comprises, in a known manner, a cylindrical movable member **86**, which protrudes vertically from an upper rotary portion **87** of carousel **7**, can be displaced along the relative axis F and has a bell-shaped free end portion **88** adapted to cooperate with the top neck **5** of the bottle **3** carried by such supporting assembly **17**.

More specifically, the axial displacements of each movable member **86** are controlled in a known manner so as to maintain the same distance between its end portion **88** and the corresponding plate **21**, during the movement of the relative unit **15** along path P from transfer station **9** to transfer station **13**, independently of the vertical displacement of the receiving member **22** between the lowered and the raised positions, and so as to increase such distance at transfer stations **9**, **13**. In this way, bottles **3** are securely hold in their vertical positions during the travel from station **9** to station **13** and are free to be transferred at such stations **9** and **13** from input wheel **8** and to output wheel **12**, respectively.

Operation of machine **1** will now be described with reference to the labelling of one bottle **3**, and therefore to one labelling unit **15**, according to the first labelling technique. Starting from the instant in which the receiving member **22** of unit **15** is located in the lowered position, within the relative supporting mount **20**, the support plate **21** receives the unlabelled bottle **3** from input wheel **8**. In this condition, the bottle **3**, which rests on plate **21** carried by the receiving member **22**, is hold in the vertical position by the combined action of the receiving member **22** and the relative upper retainer **18**.

During the subsequent movement of unit **15** along path P (angle α in FIG. **1**), ramp **72** of cam **68** moves the driving shaft **47** along axis F, so producing a translational movement of the receiving member **22** towards the desired raised position.

At the transfer station **11**, the input drum **10** reaches an angular position around axis D adapted to put the label **2** into contact with the receiving member **22** passing through such station; in this condition (angle β), a pure rotational movement of lateral wall **23** about axis F is obtained by operating the actuator **46**, to produce complete wrapping of the label **2** around such lateral wall **23** (FIG. **3**).

When the label **2** reaches a cylindrical configuration with the opposite vertical edges **34** overlapped one another and arranged on strip pad **40**, the label **2** is ready to be welded along the edges **34** by activation of the welding device **44** (angle γ).

During the last part of the path P (angle δ), ramp of cam **68** causes the receiving member **22** to return towards the lowered position within the relative supporting mount **20**, so as to produce the insertion of the bottle **3** inside the so formed tubular label **2**.

A heat-shrinking step (not shown) can be then performed on the bottles **3** exiting from the carousel **7** to obtain shrinking and adhesion of the label **2** to the bottle external surface.

When a change from the first to the second labelling technique is requested, the selection device **75** is operated to change configuration of the cam device **51**. Accordingly, cam followers **52** change their track from cam **68** to cam **67**, along one turn of carousel **7** about axis B. Once the second configuration is reached, receiving members **22** of units **15** remain in the lowered position, within the relative supporting mount **20**, along all the path P. In this condition, it is possible to feed labels (called "roll-labels") made of a material different from heat-shrinkable film. In the meantime, glue dispenser or glue applicator **29** is activated to apply glue on the back surfaces of such labels **2**, and the position of input drum **10** is adjusted to bring the back surface of labels **2** directly onto the outer surface of the respective bottles **3**, without the need of the receiving members **22**.

The advantages of machine **1** according to the present subject matter are clear from the above description. In particular, the cam device **51** permits to use the same machine **1** for processing either the so-called "roll **5** labels", to be covered with glue and to be stuck directly onto the external surfaces of the bottles **3**, or the so called "sleeve labels", to be wrapped and shrunk around the bottles **3**.

The change in the labelling technique only requires to operate the selection device **76** without dismantling and reassembling the cam and tappet device **24**.

Clearly, changes may be made to labelling machine **1** and labelling units **15** as described and illustrated herein without, however, departing from the scope of protection as defined in the accompanying claims.

In particular, the number of elements **80**,**81** in each of switch devices **76**,**77**, the width of elements **80**,**81** along track Q, and the movement of elements **80**,**81** with respect to structure **66** could be different from the ones envisaged by way of example.

The invention claimed is:

1. A labelling machine for applying labels to respective articles, said machine comprising:

at least one unit to receive and retain an article to be labeled; said unit comprising a receiving member, which extends along a vertical axis (F), is axially slidable between a raised position and a lowered position, is adapted to support a relative article, and comprises a lateral wall rotatable about said axis (F) and adapted to carry a relative label on its outer surface;

a conveying device to transfer said unit along a given path (P) transversal to said axis (F);

a feeding means having an outer lateral surface for feeding at least a label to said unit, said outer lateral surface configured to receive the label;

an actuating means for rotating said lateral wall about said axis (F) so as to wrap a fed label around said lateral wall when said receiving member is arranged in the raised position;

a welding device for welding the overlapped edges of the label wrapped about the lateral wall into a tubular label;

a cam and tappet device to axially displace said receiving member between said lowered and raised positions; said cam and tappet device comprising a cam device located in fixed position along said path (P), and a cam follower axially fixed with respect to said receiving member and engaging said cam device, wherein said cam device is adjustable between a first configuration, in which it defines a first track (R) for the cam follower, to cause the displacement of said receiving member between the lowered and raised position during movement of said unit along said path (P), and a second configuration, in which it defines a second track (Q) for the cam follower, to maintain said receiving member in said lowered position during movement of said unit along said path (P);

wherein said outer lateral surface of said feeding means is rotatable with the unit and adjacent to the lateral wall of the unit to feed a heat shrinkable label around the lateral wall of the unit while the cam device is in the first configuration and directly applies a label to the article retained by the unit while the cam device is in the second configuration; and

wherein, in the first track (R), the unit is lowered from the raised position to the lowered position after the label is made into a tubular device by the welding device.

2. A labelling machine as claimed in claim **1**, wherein said cam and tappet device comprise a selection device operable to select the track to be engaged by said cam follower and adapted to prevent the cam follower from engaging the non-selected track.

3. A labelling machine as claimed in claim **2**, wherein said cam device comprises a first cam and second cam defining, respectively, said first and second tracks (R,Q) and having a track portion in common with each other.

4. A labelling machine as claimed in claim **3**, wherein said selection device comprises a first and a second switch device, which are located at the points where said track portion ends and begins; said first and second switch devices comprise respective movable elements, which are movable to select the track to be followed by the cam follower.

5. A labelling machine according to claim **4**, wherein at least one movable element of said first switch device define a couple of guides and is movable to locate one or the other of said guides at the end point of said track portion.

6. A labelling machine as claimed in claim **5**, wherein said first switch device comprise three movable elements arranged side by side along a direction parallel to said path (P), and each defining respective portions of said guides; actuating means being controlled to move said three elements one after the other to progressively set the selected guide at the end point of said track portion during movement of said unit along said path (P).

7. A labelling machine according to claim **4**, wherein at least one movable element of said second switch device define a couple of guides and is movable to locate one or the other of said guides at the beginning of said track portion.

8. A labelling machine as claimed in claim **7**, wherein said second switch device comprise three movable elements arranged side by side along a direction parallel to said path (P), and each defining respective portions of said guides; actuating means being controlled to move said three elements one after the other to progressively set the selected guide at the beginning point of said track portion during movement of said unit along said path (P).

9. A labelling machine for applying labels to respective articles, said machine comprising:

at least one unit to receive and retain an article to be labeled; said unit comprising a receiving member, which extends along a vertical axis (F), is axially slidable between a raised position and a lowered position, is adapted to support a relative article, and comprises a lateral wall rotatable about said axis (F) and adapted to carry a relative label on its outer surface;

a conveying device to transfer said unit along a given path (P) transversal to said axis (F);

an input drum having an outer lateral surface feeding at least a label to said unit;

an actuator to rotate said lateral wall about said axis (F) so as to wrap a fed label around said lateral wall when said receiving member is arranged in the raised position;

a welding device for welding the overlapped edges of the label wrapped about the lateral wall into a tubular label;

a cam and tappet device to axially displace said receiving member between said lowered and raised positions; said cam and tappet device comprising a cam device located in fixed position along said path (P), and a cam follower axially fixed with respect to said receiving member and engaging said cam device, wherein said cam device is adjustable between a first configuration, in which it defines a first track (R) for the cam follower, to cause the displacement of said receiving member between the lowered and raised position during movement of said unit along said path (P), and a second configuration, in which it defines a second track (Q) for the cam follower, to maintain said receiving member in said lowered position during movement of said unit along said path (P);

wherein said outer lateral surface of said input drum is rotatable with the unit and adjacent to the lateral wall to feed a heat shrinkable label around the lateral wall of the unit while the cam device is in the first configuration and directly applies a label to the article retained by the unit while the cam device is in the second configuration; and

wherein, in the first track (R), the unit is lowered from the raised position to the lowered position after the label is made into a tubular device by the welding device.

10. A labelling machine as claimed in claim 9, wherein said cam and tappet device comprise a selection device operable to select the track to be engaged by said cam follower and adapted to prevent the cam follower from engaging the non-selected track.

11. A labelling machine as claimed in claim 10, wherein said cam device comprise a first cam and second cam defining, respectively, said first and second tracks (R,Q) and having a track portion in common with each other.

12. A labelling machine as claimed in claim 11, wherein said selection device comprises a first and a second switch device, which are located at the points where said track portion ends and begins; said first and second switch devices comprise respective movable elements, which are movable to select the track to be followed by the cam follower.

13. A labelling machine according to claim 12, wherein at least one movable element of said first switch device define a couple of guides and is movable to locate one or the other of said guides at the end point of said track portion.

14. A labelling machine as claimed in claim 13, wherein said first switch device comprise three movable elements arranged side by side along a direction parallel to said path (P), and each defining respective portions of said guides; the actuator configured to be controlled to move said three elements one after the other to progressively set the selected guide at the end point of said track portion during movement of said unit along said path (P).

15. A labelling machine according to claim 14, wherein at least one movable element of said second switch device define a couple of guides and is movable to locate one or the other of said guides at the beginning of said track portion.

16. A labelling machine as claimed in claim 15, wherein said second switch device comprise three movable elements arranged side by side along a direction parallel to said path (P), and each defining respective portions of said guides; the actuator configured to be controlled to move said three elements one after the other to progressively set the selected guide at the beginning point of said track portion during movement of said unit along said path (P).

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